



Monitoring Spatial and Temporal Variation in the Thermal Environment in YRD

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The Yangtze River delta (YRD) is one of the most active and developed economic belts and the largest concentration of adjacent metropolitan areas in China. It has a typical phenomenon of the regional Urban Heat Island (UHI). Investigations on the effect of UHI traditionally derived from the difference in air temperature between a single city and its adjacent rural stations, the results are imprecise because stations are not representative. Land Surface Temperature (LST) is very important to study the urban climate and human-environment interactions. In this paper, an eight-year time series of MODIS daytime LST products (2003-2010, Aqua Satellite) were analyzed. The intensity of Urban Heat Island was estimated by comparative analysis of LST in urban and water areas. Taihu Lake with an area of 2250 km² is a large lake in the Yangtze Delta plain, it was chosen as background.

MODIS LST products can reveal the spatial-temporal change process of the land surface thermal environment and the effect of regional urbanization in YRD. All cities are the warmest centers in the day, Annual mean LST in urbanized areas increases on water in Taihu Lake by more 7 [U+2103] and on rural land (mostly irrigation cropland) by more 2 [U+2103]. Annual mean LST is higher in the Taihu Lake surrounding regions, and presents the regional thermal environment in the core region of YRD, including Nanjing, Changzhou, Wuxi, Shanghai, Hangzhou and Ningbo, especially in southeast of Taihu Lake. The region from the spatial pattern of annual mean LST is consistent from 2003a to 2010a, but the area of higher annual mean LST regions increases irregularly. The urbanization impact in warm season (May to September) is stronger than that in cold season (November to February), the difference is about 2 [U+2103]. The phenomenon of regional thermal environment is more prominent in warm season.